

Gephyreans collected by Professor Dean at Manjuyodi,
Southern Negros (Philippine Is.)

BY

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With Plate VIII.

In the zoological collection made in 1901 by Professor B. DEAN of the Columbia University, New York, at Manjuyodi, Southern Negros, Philippine Is., there were found six species of Gephyrean worms, of which three have been already known while the remaining three are new. All the specimens were preserved in picro-formalin solution.

Here I beg to thank Professor DEAN for his courtesy in placing the specimens at my disposal for study and description.

1. Sipunculus australis, Keferstein.

(SELENKA: Die Sipunculiden, 1883, p. 90).

Two specimens in good condition. The larger specimen is 230 mm. long and 12 mm. broad. As is known, the skin of this species is characterized by a peculiar glistening property.

Sipunculus nudus, Linne.

(SELENKA: Die Sipunculiden, 1883, p. 92).

Five small specimens.

Phymosoma pacificum, Keferstein.

(SELENKA: Die Sipunculiden, 1883, p. 63).

Numerous specimens. All agree well in external aspects as well as in internal anatomy with the specimens I have collected in the Riūkiū Islands.

Phascolosoma quadratum, n. sp.

Pl. VIII., figs. 1—4.

The species is based on a single specimen found in the collection (fig. 1). The worm is of a medium size; the body-proper long and slender, measuring 50 mm. in length and about 4 mm. in breadth. It ends posteriorly with a small conical swelling. The introvert, which is preserved in the fully protruded state, is nearly as long as the body-proper, but much narrower. The body is of a light brownish yellow color; the surface, of a rough appearance due to the presence of closely distributed skin-bodies (fig. 2). These are relatively large (0.075 mm. in diameter), flat, rectangular in form, and closely appressed. Each of the rectangular areas is made up of very numerous chitinous granules closely set; at the center is seen a small clear space containing the external aperture of the subdermal gland. The skin-bodies are moderately uniform in size and shape throughout the entire surface of the body-proper. However, in the hooked region of the introvert, they are found as tubular papillæ arranged alternately with the hook-rows. Fig. 3*a* represents the tubular papilla, which is a colorless structure measuring 0.015 mm. in height. Immediately behind the tentacular region there follow about 30 ring-rows of hooks. The latter (Fig. 3*b*) are very small, measuring 0.03 mm. in height; golden yellow in color. Each single tooth is sharply pointed and strongly curved.

The longitudinal muscles are continuous. There are present only two ventral retractor muscles (*vm*, fig. 4). They arise near the posterior extremity of the body. The dorsal vessel is as long as the œsophagus; without contractile villi. The intestinal convolution consists of about 30 spirals which are traversed through by the spindle muscle (*sm*) fixed at the posterior end of the body. No fixing muscle is present; no rectal diverticulum. The segmental organs (*so*) are about two-thirds as long as the body-length, being fixed to the body-wall along their whole length. The external openings of the organs are placed in the same level as the anus (*a*). Two eye-spots are present on the ganglion.

The present species seems to be closely allied to *Phascolosoma macer*

SLUITER, so far as concerns the external characters. But it may be distinguished from that species in having the eye-spots, the hooks, the tubular papillæ on the introvert, and in wanting fixing muscles.

Habitat: The worm was discovered on a shallow sandy beach.

Phymosoma deani, n. sp.

Pl. VIII., figs. 5—8.

Numerous well preserved specimens. The body measures, in the largest specimen, 35 mm. in length and 10 mm. in breadth, the introvert being $1\frac{1}{2}$ times as long as, but much narrower than, the body-proper. The introvert is of a yellowish brown color, while the body-proper is colored deep brown. The papillæ are especially large near the base of the introvert and at the posterior end, in both which regions they appear as deeply brownish-black spots. Each spot thus marked presents the form of a tall cone (0.13 mm. high), made up of numerous polygonal chitinous plates (see fig. 6). These plates become gradually smaller in size and deeper in color towards the apex, which is covered with very small granules of a light brown color. In the middle part of the body, the papillæ are much smaller in size and lighter in color than in the regions just referred to, and are very sparsely represented. The anterior region of the introvert bears about 50 complete and 150 incomplete rows of hooks. The hook (fig. 7 *a*) is brown, about 0.04 mm. high, and has a sharp tooth. From the convex edge of the hook, rather near the basis, a lateral bar-like thickening arises and runs transversely to the concave edge. Between every two rows of hooks, there is present a ring row of very small (about 0.03 mm. basal diameter) and almost flat papillary bodies (fig. 7 *b*). Each of these bodies consists of two concentric rows of chitinous plates, around a central area containing the external opening of the subdermal gland.

The longitudinal muscles are divided into 17-18, at places anastomosing bundles. Of the four retractor muscles, which arise near the posterior end of the body, the ventral pair (*vm*, fig. 8) are very slender and originate from the first longitudinal muscles, while the dorsal pair (*dm*) spring from

the second and third longitudinal muscles a short distance behind the roots of the ventral muscles. The intestinal convolution, consisting of about twenty loose spirals, twists itself around the spindle muscle, which is fixed to the posterior end of the body. There exists no fixing muscle. A small rectal diverticulum (*rg'*) is found attached to the very beginning of the rectum. The dorsal vessel bears no contractile villi. The segmental organs of a deep brown color are nearly half as long as the body-proper, and are fixed to the body-wall along their whole length by a mesentery. Their external openings lie slightly in front of the anus (*a*) and between the fourth and the fifth longitudinal muscle. No eye-spots. The tentacles, 8 in number, are lobose.

The species described above seems to be most nearly allied to *Phymosoma lurco* SEL. and BUELOW and to *Phymosoma rhyzophora* SLUITER. But it differs from the former in the size of body, in the form of papillæ, in the size and form of hooks, in the form and mutual relations of the roots of the retractor muscles, *etc.*, and also in wanting diverticular appendages to the segmental organs. It differs from the latter in the form of papillæ, especially of those on the introvert, in the relative position of the segmental organs and the anus, and in the absence of eye-spots.

Thalassema manjuyodense, n. sp.

Pl. VIII., figs. 9—10.

Only one specimen, wanting the proboscis (fig. 9). The body is of a broad spindle-like form, measuring 18 mm. in length. The skin bears a grayish green tint. The papillæ are very small, almost invisible with the naked eye, except at the posterior end of the body where they are somewhat larger and are arranged more or less in circular rows. The ventral hooks are relatively large and of a golden yellow color. They are internally provided with an interbasal muscle (fig. 10, *im*) which extends across over the pharynx. The longitudinal muscles are divided into 14 broad bundles. There are present two pairs of short and tubular segmental organs (*so*)

provided with long spiral lobes. They are all situated behind the ventral hooks. The two brown anal glands (*ag*) are longer than half the length of the body; they are without any fixing muscle. Over their entire surface are distributed numerous short-stalked funnels, which are large enough to be detected with the naked eye. The rectal diverticulum of a globular form (*rg*) is situated on the ventral surface of the terminal portion of rectum, and is fixed to the nerve-cord by a delicate mesentery (*m*).

This species seems to stand systematically very near to *Thalassema pellucidum* FISCHER, which likewise possesses two pairs of segmental organs and separate longitudinal muscles. But the two forms differ from each other in the color of skin, in the number and breadth of longitudinal muscles, and in the absence or presence of the rectal gland.

Explanation of figures in Plate VIII.

Phasolosoma quadratum, n. sp.

- Fig. 1. The single specimen, slightly reduced.
 „ 2. Surface of skin showing rectangular skin-bodies. Magnified.
 „ 3. *a*, a tubular papillæ. *b*, a hook. Both in lateral view. Magnified.
 „ 4. Anatomy of the specimen.

Phymosoma deani, n. sp.

- Fig. 5. A specimen, slightly reduced.
 „ 6. Dermal papillæ in top view. Magnified.
 „ 7. *a*, a hook. *b*, a papillary body in top view. Magnified.
 „ 8. Anatomy of the species.

Thalassema manjuyodense, n. sp.

- Fig. 9. The specimen, wanting the proboscis. Natural size.
 „ 10. Anatomy of the specimen.

Explanation of abbreviations.

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| <i>a.</i> , Anus. | <i>n.</i> , Nerve cord. |
| <i>ag.</i> , Anal gland. | <i>oc.</i> , Oesophagus. |
| <i>dm.</i> , Dorsal muscle. | <i>ph.</i> , Pharynx. |
| <i>hk.</i> , Ventral hook. | <i>rg.</i> , Rectal gland. |
| <i>ic.</i> , Intestinal convolution. | <i>sm.</i> , Spindle-muscle. |
| <i>im.</i> , Interbasal muscle of ventral hooks. | <i>so.</i> , Segmental organ. |
| <i>m.</i> , Mesentery. | <i>vm.</i> , Ventral muscle. |
